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The Present-day Organisation of Veterinary Research in Great Britain: Its Strengths and Weaknesses *

(*Continued from page* 456)

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Veterinary research in this country in the sense of planned and sustained investigation of animal disease problems is about 50 to 60 years old. It can be said to have started with the pioneer work of M'Fadyean, and he and his students were largely responsible for the basic foundation of veterinary research in this country. We should always remember that they achieved results with the minimum of material help; they were short of funds, apparatus, accommodation and experimental animals.

To-day the position is greatly altered. There are four research institutes whose activities are wholly devoted to veterinary research, apart from departments within the teaching schools who undertake research work, the posts in non-veterinary institutions held by veterinary surgeons, at least three big commercial undertakings with considerable veterinary research interests, an expanding veterinary investigational service under the Ministry of Agriculture and the start of a new research centre by the Animal Health Trust. There are approximately 150 veterinary surgeons engaged partly or whole-time in veterinary research. Government and other outside bodies are sympathetic to the need for research into animal health problems. Money, buildings and equipment are likely to be increasingly available in the future. It appears that at no time has the material status of veterinary research been so favourable.

In my opinion, such a moment is the time for a critical analysis of our position. It must be remembered that successful research is not merely a matter of money, buildings and equipment, for unless research is pursued by the right type of worker, inspired by the right attitude to his work and working in a congenial atmosphere, no amount of financial investment in research is likely to yield good results.

Organisation of veterinary research may be discussed from many angles, but I propose to discuss the subject under three main headings: (1) Recruitment; (2) Planning and Finance; (3) Direction and Administration.

(1) *Recruitment.*—We must face the fact that each division of biological science has become the preserve of the specialist, and fundamental advances in knowledge in any particular field can only be provided by the worker with the specialised technique. We must also realise that the ordinary veterinary training does not, should not and never will provide the specialised training in any one discipline. No longer can we afford the delusion that a veterinary qualification *per se* is the open sesame to a research career.

Conversely, the specialist who has a basic veterinary training will be able to apply his findings to the practical problem more intelligently and look at it in its wider aspects. Veterinary research will always need the contribution of the non-veterinary specialist, but any broad advance will depend in the end on the qualified veterinary research worker.

There is no doubt that 6 to 12 months in the hurly-burly of general practice is a very desirable background to post-graduate research training. The post-graduate training should be designed to achieve the maximum acquaintance with the techniques of the particular subject and to inculcate the habits of scientific thinking, planning and analysis. It should, almost without exception, include some introduction to statistics. (Far too many of us suffer from the inability to use or appreciate this invaluable research tool.) It cannot be emphasised too strongly that the post-graduate period should not be used for any extensive individual research. The practice of which the Ministry of Agriculture and to some extent the A.R.C. are guilty, of appointing recent graduates to undertake research on specific problems in the pious hope that while they are fumbling with them, they will incidentally train themselves as pathologists, bacteriologists or acquire some such specialised technique, cannot be too vigorously condemned.

As things are to-day, the post-graduate training in most subjects is best acquired away from the veterinary atmosphere. The contact with the veterinary aspects of his work will be rapidly reacquired when the graduate takes up his whole-time appointment. Of course, there are exceptions to this statement, such as specialisation in medicine or surgery.

To define the type of man to recruit is probably impossible, but certainly an intense curiosity plus an analytical and critical mind are necessary qualifications in the recruit. The brilliant student is by no means always a useful addition to research strength, and certain temperaments are quite incapable of ever being trained as research workers in any field. The dictum that the right kind of recruit can only be attracted into research by better and higher salaries is fundamentally wrong. Much of the most brilliant research has been done by men on a mere pittance. This should not be taken as an excuse for continuing to pay poor salaries, but it will be a sad day for research when recruitment of the best men depends on high salaries. There is something to be said for commencing salaries being low for the first few years and for the higher salaries and more rapid promotion to come in the 30 to 45 age group when financial demands on the individual are heaviest.

Nowadays, considerable stress is laid on the need for sabbatical leave for research workers, and undoubtedly the complete change of scene and the contact with fresh minds working on the same problem are immensely refreshing, as I can testify from my personal experience. However, there are considerable difficulties in arranging such leaves. Long leaves require a complete reallocation of duties, especially in a teaching institution, and it is not every man who can leave his personal and family responsibilities for any length of time. Furthermore, although financial allowances may be made for travel, accommodation, etc., they do not always cover expenses which arise as a result of absence from home. Probably the most useful and convenient sabbatical leave is that which lasts two to three months and which can be fitted into vacations by those with teaching duties. One would like to suggest that the Animal Health Trust might support financially such leaves of absence for established research workers whose laboratories are unable to finance them.

(2) *Planning and Administration.*—We are constantly told that research to-day must be co-ordinated and pursued by research teams, and certainly the recent war intensified this trend. Typically, the set-up tends to be as follows: a centralised planning committee manned by experts, some of whom may be actually responsible for or engaged in the projected work; the work itself delegated to a number of laboratories, and different aspects of the problem studied by various specialists. The plan is laid down by the committee, and the different units concerned pursue the problem on the lines laid down, reporting back to the committee at intervals. The committee co-ordinates the work and finally may or may not arrange for the publication of the results. Now, on paper there are many advantages to such a set-up; the ground is covered more quickly, unnecessary duplication is avoided, and results from different laboratories are comparable as techniques and experimental layouts have previously been agreed on. Many of the A.R.C. committees function on these lines.

However, there are grave dangers in such a system, and it would be well to give careful consideration to them. Firstly, the committee should always have a strong preponderance of members actually engaged in research on the problem, and by that I mean doing the bench work itself. Secondly, it should never be forgotten that the workers who do the work, especially if it is long-term work, blue printed by some remote committee, can easily lose their zest for the job and certainly run a serious risk of losing their initiative. Many of the research committees are sponsored by Government departments, and once a Government department has the information it requires, there is a tendency for the information to be pigeonholed. Certainly the publication of the results in scientific journals may be inordinately delayed. For instance, where are the results of Weybridge's work in 1938 on equine infectious anaemia? Why did the profession have to wait so long for the evidence on the comparative merits of S.19 and 45/20, *Br. abortus* vaccines? What is the evidence for the adoption of the single intradermal tuberculin test and where are the detailed results of the A.R.C. work on penicillin treatment of mastitis? For the majority of research workers, the most satisfying reward for their efforts is the publication of an article

* Discussion by the Association of Veterinary Teachers and Research Workers, at the meeting held in Liverpool on April 13th, 1948.

under their name in some reputable scientific journal; the failure to report work or the tardy publication of some anonymous Government report is hardly an adequate recompense for months or even years of monotonous investigation. It should be a fundamental obligation on the part of a research worker to publish his work in a scientific or professional journal before such work is released to the public. If such work is not ready for scientific release, it is certainly not ready for the public. Examples of this pernicious practice are not uncommon. There was a particularly glaring case last week. Instances have arisen where veterinary surgeons have heard of such work from their clients who may have acquired the information from a public lecture or a popular article. In my opinion, such action is unethical and cannot be too strongly condemned.

Finally, it should be realised that some research workers are temperamentally unsuited for closely integrated team investigations, and such men provide their best when left to their own devices.

No discussion of present-day veterinary research would be complete without some consideration of its financial background. Broadly speaking, financial support is obtained by public subscription (A.D.R.A. and A.H.T.), endowment, university grants, and Government support.

There can be few veterinary laboratories which are not in some degree dependent on Government grants. No one in his senses will regret Government support for veterinary research, but we must not ignore the fact that he who pays the piper calls the tune, and as far as veterinary research is concerned, the A.R.C. and the Ministry represent the piper. A veterinary laboratory wishing to undertake a research project requiring considerable financial outlay must, almost without exception, enlist the support of the A.R.C. It cannot be altogether sound that one organisation has such an overwhelming influence on veterinary research. It has not been unknown for the relevant committee to have delegated work to another institution than the laboratory from which the research proposal originated. Inevitably, the big institutes tend to be favoured as their facilities for large-scale work are better.

The support of veterinary research by universities and independent bodies such as the A.H.T. is to be welcomed as off-setting the preponderating influence of government, and if one may venture the suggestion one would like to see the A.H.T. remain completely free of Government support, even at the cost of a reduced income. The freedom will be worth it.

(3) *Direction and Administration.*—Inevitably a director of a research institute has many demands on his time and energies; these demands include administrative duties, committee work, public relations and supervision of research. There can be no question that supervision of research *in his own institute* should be a director's primary responsibility. Generally speaking, a man is appointed to a directorship because of his previous research achievements in his own particular subject, and the greatest weakness of the present system is that everything conspires from then on to keep him away from active participation in research or even active direction of research in his own institute.

Administration becomes an ever-increasing burden, especially in these days of shortages. It is fantastic that a man of proved scientific ability should have to concern himself with such problems as industrial clothing coupons, licences for farm workers' cottages, cattle food and the buying of laboratory and farm equipment. In the large institute or field station these duties become a whole-time job. In some cases the appointment of an administrative officer is absolutely essential to free the director for his primary duties, and a farm manager must always be on the staff of a field station. The next call on the director's time is attendance at committees. A director or head of a department may have several problems under investigation in his laboratories. Some of these problems are subject to committee control, and as a result he is a member of these committees—these are apart from other committees which claim his attention. Attendance at these meetings makes serious inroads into his time. Much of this could be avoided by reforming the committee system as suggested above so that membership was restricted to those actually doing the work under the chairmanship of a senior worker also engaged on the problem.

While it is realised that it is of great importance to bring advances in knowledge to the notice of the farming community, this aspect of public relations is liable to get out of hand and make too great a call on time which should be devoted to research. Public lectures, talks to farmers, visits of farmers to the laboratory and the like are tending to absorb the energies of many directors. It may well be in the future that special appointments should be created to take care of the public relations aspect of veterinary research.

Ideally, the director is a man who is in constant touch with his staff, freely available for consultation, capable of understanding the problems involved and able to offer general scientific guidance, and within his own subject specific technical advice. There can be no excuse for the state of affairs in which some junior workers do not see their director for weeks on end, and are left without supervision or guidance. This situation holds in more than one institute to-day. The senior worker in veterinary research has to face and resist the temptation to become "a man of affairs." Once this temptation is yielded to, his value to research drops sharply. The greatest single weakness in veterinary research to-day is the lack of leadership and inspiration in many institutes.

I am afraid I subscribe to the old-fashioned view that a research worker's job is research. The research worker should shut himself off from outside distractions—committees, public lectures, "putting over research," advisory work and the like, are not his concern, and the more they are indulged in the more research suffers.

These criticisms are not offered with any spiteful motive, but are conclusions slowly come to in the last 14 years partly as a result of one's own experiences in several different laboratories and partly from discussion of such matters with many of one's colleagues all over the country.

Veterinary research has achieved a great deal in its brief history. It now stands on the threshold of a future full of great promise; it remains for us to assess our strengths and remedy our weaknesses. Such action can only follow a frank and free discussion of our shortcomings.

General Discussion

Dr. R. Lovell: He had listened with interest to the papers which had been read, but must disagree with Dr. Taylor, who had implied that graduates in pure science made better research workers than graduates in veterinary science. It was often not so much the training as the type of mind which was the determining factor. One must recognise at least two types of research worker; whilst one type was suited and happy in dealing with surveys and *ad hoc* problems, the other preferred to investigate that which was more fundamental. Nothing should be done to frustrate or discourage this latter kind, that is, the man with the inventive and enquiring mind; such men were few, and he could understand the feelings of those who had their problems, and their approach to problems, directed for them and dictated to them. It needed tact and wisdom on the part of those who had this authority, but guidance, not direction and dictation, was necessary for the young man who showed promise of dealing with fundamental research. Furthermore, although the salary was not the primary need of such individuals, they should be paid salaries commensurate with their value to the community; this might be difficult to assess, but under-payment and lack of adequate status would often force men to seek fields other than those in which they could do the maximum good.

Professor C. W. Ottaway: He would like to introduce a matter not mentioned by any of the opening speakers, namely: supply of material for research. The vast majority of veterinary research was within the spheres of pathology, bacteriology, preventive medicine and animal husbandry. In these the problem of supply was not great. Material was available in the laboratory in the form of apparatus, cultures, experimental animals, etc., or work was conducted in the field on selected herds or at the call of an outbreak of disease. But in fundamental biological research, a line which had been grossly neglected by the veterinarian, this was not so. Mr. Jamieson had referred to the necessity for recording details of normal weight, size and shape of organs and, admittedly, material was available for this important need; but in the elucidation of problems of normal form and function the study of abnormal states was of considerable value. That such abnormal specimens were available, indeed, that they were thrown on to the muck-heaps of farmyards daily, was undoubted. The problem was, how was the researcher to obtain them?

The present state of affairs was often that when colleagues learned that a worker was engaged on a particular line of research, they would kindly send specimens. As a rule, however, they were not quite of the type required, and the worker spent a deal of time examining a specimen, as a necessary duty to the donor, which possibly would not further his particular line of research. At other times, when opportunity was presented to deal with specimens not quite specific to the problem, none turned up.

A possible solution he would like to put forward for the consideration of the meeting was that colleges or institutes, or possibly a new institute designed for the purpose, should act as collecting centres for material of value to fundamental biological research. The specimens obtained should be stored and catalogued and made available to research workers as requested. Such a collection would be of great value to all workers in the general field of biology, veterinary and otherwise. If it were thought sufficient specimens would not be forthcoming to maintain an institute, it could perhaps be combined with a laboratory service for practitioners; all would agree there was certainly need for more of these.

Mr. S. J. Edwards: He had listened with great interest to the remarks of the opening speakers who had dealt with a wide subject most lucidly. He found himself at variance with only one point made,

namely, the suggestion that students in veterinary science compared unfavourably with those undertaking other sciences. If such differences existed they could be regularised by a higher standard of entrance examination, although it was clear that even the universities had by no means arrived at a common standard in this respect. What was essentially wrong in the pre-selection period outlined by Dr. Taylor, was the lack of direction and, furthermore, the lack of opportunity granted to those graduates having a scientific bias. In his opinion, it was largely fortuitous at the present time that graduates found themselves in research appointments and it was true to say that most gravitated into practice for the reason that this was the vocation upon which their attention had been primarily focused during their training—and the pursuit of which offered many attractions, as Dr. Taylor had pointed out.

Closer collaboration between directors of research institutes and teachers might be made in the first place, so that those students with a scientific outlook might be encouraged to select research work as their future career. Further, it was necessary to promote a larger number of post-graduate scholarships for the tenure of veterinary graduates with considerable freedom to study the various aspects of the broad field of animal investigation.

Probably the best contribution made by the younger worker was that in which he participated in team work under a director who was himself actively engaged in bench work, and for that reason it was greatly to be deplored that the administrative machine of the present day was allowed to absorb such a large part of the invaluable time of the competent scientist. Freedom to practice the quest of research alone was desirable for most workers after a varying length of service, but to some it was axiomatic because they were temperamently unsuited to the team. As Mr. Hughes had rightly stressed, the independence so granted sometimes culminated in important discoveries, always provided that there were no restrictions on the free publication of results.

Dr. C. S. M. Hopkirk, after congratulating speakers on the treatment of the complex subject of veterinary research, went on to say that he had come to the meeting to hear just how veterinary research was conducted in Great Britain, but all he had gathered was that it was not organised. He put forward several suggestions for consideration.

1. That a Central Directorate was required, covering all animal health activities, to co-ordinate research.

2. That diagnosis and research should be closely associated, for in that way research workers obtained material and were able to judge which diseases were of primary importance in the country. At the moment it seemed necessary to give precedence to problems which were important from the point of view of increased production.

3. That research should be closely linked with the Agriculture Department so that there would be a flow of information from the farmer and to the farmer, by way of field officers who carried out the extension work of the service.

4. That it was a mistake for serious long-term projects to be carried out by teachers who had to give close attention to large classes of students. It was unfair to either side, for it took up the time of a teacher who should be preparing lectures, and it might mislead students who would tend to receive instruction in ideas not fully proved.

All veterinary research work in Australia and New Zealand came under the direct guidance of controlling bodies—in Australia by the C.S.I.R. through the Animal Health Committee, or by State Agricultural Departments linked with the Animal Health Organisation, and in New Zealand by the Department of Agriculture, Veterinary Research Division. Research work was therefore carefully co-ordinated and carried out by teams built up to suit the problems considered of importance. The Laboratory Directors saw to it that the more fundamental work was protected and not unduly criticised while in progress by putting up a certain amount of window dressing of minor research for the public.

He did not quite agree that a Director of a Laboratory had as little knowledge of the affairs of the laboratory as the speakers might lead one to believe, judging from his own experience and a knowledge of the work in New Zealand and Australia.

To staff research projects, he considered it was wise to choose students for a veterinary education and to watch their progress through college in order to advise them to take up positions which suited their temperaments following graduation, but all young graduates should have as much field experience as possible before becoming research workers. It was so necessary to keep contact with animals and not to get too deeply involved in the laboratory.

The idea of team work seemed to work well in practice, as instanced, for example, in New Zealand in facial eczema when the team, composed of all types of scientists required, formed a committee, each member contributing his knowledge to the problem to be investigated.

Dr. J. T. Edwards: After an absence abroad in Egypt, he had been much interested to listen to the frank expression of their views made at the meeting by speakers who had entered the field of veterinary research several years after he himself, who believed he was the first to receive a State subsidy for whole-time veterinary research, had entered it. In spite of the somewhat gloomy forebodings of some of the speakers, more particularly in regard to the present direction of research at State-subsidised institutes, there was much that he had noticed since his return, especially in comparison with what he had observed abroad, that was extremely heartening. He could not but be impressed with the competence shown by workers in attacking their problems as revealed by their contributions to the discussions at the several society meetings which he had attended since his return. The truth was, to his mind, that veterinary research as an organised institution, under the sponsorship of the State, was still very young and, as such, was experiencing its "growing pains." For all that might now seem to be much amiss to the individuals actually engaged in research, great sympathy with them was therefore called for.

Indeed, the "birth" (or, perhaps, more appositely, the "conception") of modern veterinary research in this country could be dated back precisely to the year 1910, and, for reasons that we could now discern more clearly, it was hampered, through no fault of its own, from getting properly on to its feet for several years; so much so, that it was not surprising that its progression was in many ways still much stilted.

It was in the year 1910 that something "entirely novel" in the way of administrative machinery was introduced by the legislature to finance research in the shape of the Development Fund, an appanage of Lloyd George's famous People's Budget of 1909. Since then, the Fund had lapsed as a means sufficient in itself to subsidise, on the present lavish scale, the various forms of research, but it represented at its origin a new concept in British administration, which until then had been, for potent reasons, hostile against nurturing anything of the sort.

For example, readers of the history of the Royal Society of Arts, the earliest society of its kind, founded in the latter half of the eighteenth century, could not but be impressed with the state of mind prevailing in the country at that time, and the enormous ethical evolution which we must recognise to have taken place since then. To foster progress, particularly in agriculture—because the industrial revolution had not properly got under way at the time—talent had to be discovered and encouraged as much as possible by a free society. For, with the prevalence of nepotism, patronage, and what we would now condemn as outright corruption, such as was still familiar in the Orient, the State could not be entrusted with the custody of public money allotted for social betterment. The duties which it had perforce to fulfil were confined to the defence of the realm and the preservation of order. The long temporary spontaneous disappearance of major animal plagues from Britain towards the end of the 18th century until nearly the middle of the 19th century unfortunately caused relaxation of interest by the rising agricultural societies in enquiries into animal disease and hence in veterinary education, which, consequently, was doomed for long to be entrusted to unworthy and incompetent hands.

Thus, we saw that the movement for the establishment of veterinary education came from an agricultural society (the Odiham Society in Hampshire). Much later, the Royal Agricultural Society of England, within its restricted means, lent support by the aid it gave to the introduction of teaching upon the diseases of cattle and other farm stock. The original intention of the Odiham Society had been superseded by concentration upon the single subject of the horse, which was the only subject able to provide a livelihood—and a good one, too—for practitioners after the industrial revolution had really got under way, bringing in its train the congregation of the human population into dense urban areas and the development of highways fitted for horse-drawn traffic.

When he (the speaker) entered as a student at the Royal Veterinary College in 1907, almost the only outlet for the graduate seemed to be horse practice: the Army certainly called for the services of a fine corps of veterinary surgeons, but the prospects under the Board (now the Ministry) of Agriculture seemed to be dismal indeed. It was little anticipated then that with great change in the prospects soon to come, those content with them as they dismally were at home at the time were destined later to float upwards within an expanding hierarchy so as, despite mediocre ability, to wield ultimately power over coming intense developments in research and naturally to resent appointment to it of any who would make them feel uncomfortable. Overseas, especially in India and, to some extent in the Colonies, the prospects were much better, but the numbers required were not large. Anything in the way of employment in full-time research seemed out of the question—there was no money for it. What research there was that had been achieved in this country was done by the teachers at the colleges, and even by them only fitfully, because in the selection of teachers little or no attention had been paid, most unfortunately, to their capacity

for undertaking research. Where any teacher had arisen, as in the cases of John Gamgee and John Barlow, with the necessary intellectual equipment, misfortune or early death had dogged the prospects. The teachers, again, were so badly paid that unless in some ways they were able to supplement their incomes (as Coleman did originally with a vengeance and to the detriment of all progress), they could hardly live; and, as George Fleming on one occasion bitterly remarked, the main qualification for a graduate to gratify his vanity early to be designated as a professor was a capacity to subsist on a meagre dietary.

So, whereas the Continental schools during this long period, heavily subsidised as they were by their States, were producing men of great eminence as teachers and researchers, the starved British schools were condemned to provide for their students in the way of real knowledge mere "crumbs that had fallen from Continental tables," in the words of M'Fadyean, while the State stood aloof—contemptuously, as was thought by most at the time, but in reality, with the better appreciation that we now had of the history of the period, helplessly. For there was no question whatever that since that moment arose in 1910, when veterinary research was at last brought to life, the tables had been completely turned. In spite of all handicaps, which were still remaining, and which doubtless would be removed in time, Britain stood now in relation to the formerly great contributory countries of France and Germany no longer in a state of beggary. For example, it was no longer absolutely essential, as it was at the time of the speaker's own entry into the field of veterinary research, to obtain an apprenticeship in those countries and to gain a mastery of the French and German languages to be abreast of the literature. The English language, the vehicle of expression of the present great productive countries, Britain and America, had become almost the *lingua franca* of scientists, to some extent as Latin had become that of all men of learning in the Middle Ages.

What transpired immediately after the beginning of the new era, in 1910, was graphically set forth in the successive reports of the Development Commissioners. It was realised at once that, even with funds available, the men were not available who were able to carry out research, and *the first step must be to train such men.* The Fund was therefore diverted in the main for that purpose, and under an enlightened President of the Board of Agriculture Mr. Walter Runciman (afterwards Lord Runciman), 12 agricultural scholarships, each of three years' duration, were instituted yearly for that specific purpose. He (the speaker) was the holder of the first of these scholarships which was allotted for veterinary research, and being present there that day and still in active work, that visible testimony would afford them an indication of how young veterinary research still really was in this country, that scholarship having been awarded to him at the end of 1911 or very early in 1912.

Besides that scheme, money from the Fund was also allotted, in the second place, to buildings, the first of the kind being the erection, at the behest of the then Chief Veterinary Officer, Sir Stewart Stockman, and active support of Mr. Runciman, of the Veterinary Laboratory at New Haw, near Weybridge. It would be difficult for the present-day worker to imagine the penurious circumstances in which the Board of Agriculture carried out diagnostic and investigational work before that laboratory, much expanded as it now was, had come into being.

The only substantial nidus for the training of a veterinary research worker within the country, however, lay at Sir John M'Fadyean's laboratory, comprising two rooms, which were also used as office and for diagnosis and class preparation purposes at the College at Camden Town, and so at its very outset the nurturing of veterinary research was fated, for good or for ill, to be dominated by that masterful personality. With State grants received for the first time in moderate abundance, the volume of research undertaken there increased phenomenally and more young men were admitted for assistance, when, within three years, the whole enterprise was doomed to frustration of such a kind that it never fully recovered from its effects, and the evil consequences whereof were still only too glaringly in evidence.

The country had had no experience of a major war for a century, when, indeed, it was largely that same cause, namely, a long war straining the whole resources of the country and diverting its attention from social issues, that had frustrated the well-designed plans laid for veterinary education at its very inception in 1791. Now, with war breaking out in 1914 and from an early phase of "business as usual" gradually assuming a significance when no one could foretell what would be its duration and magnitude, research, as such, was relegated to the background, for, as yet, in war itself research had not come to be appreciated as a weapon of prime importance by contestants, or, at least, by the British and Allied side.

All the same, when the war was over—as all war was, it was fondly and foolishly believed by many, for all time—it came to be realised (as is well described in the reports of the Development Commissioners) that the German nation had been acquiring resourcefulness of a kind which this country had found hard to match because of the assiduous care it had given to fostering research. Hence, that lesson must not be lost by the State. So while during the period of retrenchment which followed some time afterwards, many delicate enterprises in new and promising fields of research (such as genetics) which deserved tender care in their development were doomed to be smothered, there occurred, in several directions, activities characterised sometimes by impetuosity rather than prescience.

Above all, it was appreciated that veterinary research had lagged lamentably. This was evident, for example, from the report of the Hopkinson Committee which had sat before the war to enquire into recruitment of veterinary personnel for the public services. And so, after the war, in 1920, a powerful committee, sitting under the chairmanship of Sir David Prain, the Director at Kew, reported to the Development Commissioners on ways and means to redeem the abject state in which veterinary research remained. Reading the report at the present time, one could not but be impressed with the timidity of the Committee in pressing forward its recommendations and the parsimony of these recommendations in the matter of the expenditure which the State was likely to set apart at best for their implementation. The outcome certainly was, at any rate indirectly, the opening of the research institutes at Cambridge and Camden Town and the support given to the Moredun Institute.

But now, the young men trained at the earliest stages, as also for the projects for agricultural improvement in other directions, either had been killed or had had their careers ruthlessly chequered as the result of the war, leaving to some extent, though this was not quite so much in evidence in the veterinary field, merely the "precious indispensables," as they were called at the time, among the older ones available for any pickings.

For the first time, therefore, impetus was given to progress, but in the direction, it seemed in the first place, *of erecting buildings*, or institutes, for the execution of research, and not, as had been the original more enlightened intention, of providing in the first place a cadre of highly disciplined researchers, and afterwards furnishing them with the necessary amenities for actual work as it naturally evolved.

Overseas, in territories where animal disease loomed large in the local economy, as in India and South Africa, magnificent organisations, at Muktesar and Onderstepoort respectively, had come meanwhile into being, and were making some demands upon what might be termed the cream among the younger researchers, little anticipating that change in the political control in those territories would soon make tenure of their posts precarious or even dangerous.

Hence, for the "temples" springing up at home what was "safest" in the way of managers, or, as they were more grandiloquently called, "administrators," came to be selected, who so long as "reports" were submitted to the higher officialdom, either direct or through committees, that would appease interpellators in the legislature, were deemed completely "satisfactory," even though nearly all incentive to pioneering was thereby sterilised.

The Prain Committee had, indeed, recommended the creation of a special Animal Health Council to control and co-ordinate veterinary research, but mainly through the vigorous opposition of Stockman, who castigated committees as a "disease of the age" and as mere agencies designed to waste the time of workers by calling for reports that were not acted upon, and of M'Fadyean, who stressed that all the men engaged in real veterinary research at the time were not sufficiently numerous in themselves to constitute a committee, the project failed.

When, soon afterwards, an Agricultural Research Council was set up and veterinary research was designated for control either by scientists without veterinary training or by veterinarians without scientific training, M'Fadyean publicly condemned the announcement as an affront to the veterinary profession and veterinary research.

There was much more that could be said—about the economic and other considerations and conflicts of interests and personalities during that critical early period—as affecting veterinary research, its happy conception, difficult birth and troubled infancy, which would explain away much that had been expressed that day in the way of misgiving by those younger speakers who came afterwards to cast their careers in direct association with it. But withal, contemplation of the scene thus unfolded would provide much gratification, if they but knew it, that veterinary research had, of its own innate vitality, grown in Britain to become the vigorous though rather queer adolescent that it now was.

When war broke out again in 1939, the whole mood of the country had changed. Research was no longer something that was allowed to survive on sufferance, but it was something that must be fondly bolstered up at all costs. Veterinary research became exalted to the status of a "reserved occupation," so that the worker engaged in it need suffer no qualms of conscience about the manner in which he could best serve his country. Perhaps, the assiduous nursing of research might be contemned as amounting to actual "spoiling" when, during the early stages of the war, such little "sense of urgency" (as the present Chancellor of the Exchequer called it) and

"sense of proportion" were displayed that public money was lavishly expended on such projects as the building of palaces for guinea-pigs instead of tanks to beat Germans.

And even with the strained resources of the country following the termination of the war, there had been, and rightly too, no question of curtailing research, for, at any rate, there surged at last in the public mind no petulant recriminations, such as were expressed in bold headlines after the former war, that it was among "the fads we cannot afford." But, rather there was good augury that, wisely pursued, it might provide humanity with what mere dialecticians hitherto had failed to provide, namely, real knowledge on how to prevent wars. Most surely the portents were that unless its direction was also changed from the hands of those selfsame dialecticians into those of workers who had gained mastery eventually in the social sciences it would provide the means of ending humanity itself. Alternatively, recalling his own experiences, it might perhaps transpire that it would need 80 or more "passages," instead of the 48 already accomplished, through the "goats" who were the world's politicians, before the virus of the great plague periodically devastating human "cattle" had become safely "mutated" to that of the "fixed" mild status of the Christian ethic, and the spread of calamity averted by "interference."

Dr. Edwards finally contended that what had been alleged by the several speakers as shortcomings in the present organisation of veterinary research was by no means confined to veterinary science, but, from his intimate talks with highly placed individuals in the other sciences, it applied with almost equal force to the institutes in which those sciences were also prosecuted. He instanced the comparative development of the Cavendish Laboratory and the National Physical Laboratory; whereas, in the former case, under a long succession of remarkable scientists as directors, who had remained "human" and unspoilt in spite of—or perhaps because of—their greatness, physical research had had an inspired "destiny", at the latter, under a bureaucracy, "investigation," within the narrow meaning of Dr. Taylor's definition of the word, had been conducted to the exclusion, so he was informed, of almost all inspired endeavour. Perhaps, in the future, the contention made by Dr. Lovell would come to be acted upon, namely, that to promote inspired research at our Institutes, and forestall sterility, the directors would come to be selected for appointment only after their gifts of personality, as well as their genuine scientific ability, had been thoroughly assessed by a body of competent psychologists.

Dr. M. A. Soltys: Recruitment of veterinary research workers in Continental countries was mostly undertaken by the universities, where young students were trained by the professor and his assistants. If a student was specially interested in any particular line of science, he asked the professor of that subject in which he was interested to allow him to work under him and later to give help in the department. Providing that the professor considered him both suitable and capable, he was nominated as a demonstrator. In this capacity he assisted in practical classes given to the students and also helped senior members of the staff in their research work.

As soon as he was qualified and a suitable vacancy occurred, he was made a junior assistant to the professor. Some years were then spent in research for his doctorate and after that he could proceed to a senior assistant's post. Some remained at the university, whilst others preferred to go to one of the research institutes. This type of training had the advantage of giving a broad fundamental knowledge of the subject as a whole, both practical and theoretical. This obviated the danger of the new graduate fresh from the university being sent to a research institute and possibly being left to grapple alone with a problem in which no one else in the institute had much experience, or used immediately in a narrow specialised field of research without getting broader experience in the subject as a whole.

Research institutes were in the majority of cases combined with diagnostic stations, and the staff consisted of bacteriologists, serologists, pathologists, parasitologists and chemists or biochemists with some experience in toxicology. Subjects for research naturally were often conditioned by the problems which confronted the diagnostic stations. Apart from that, any line of research which interested the individual worker could be pursued and absolute freedom of choice was given him.

Mr. W. J. Jordan: There was little doubt that he was one of the youngest there that day, and had not yet entered the hall of wisdom. Having so little experience of research, he could not presume to offer criticism to all that had been said, but it might not be out of place to ask a few questions.

Mr. Hopkirk, after telling them of the organisation of agriculture and all things pertaining to it in New Zealand, asked for an explanation of our organisation. Might he take that a little further to ask: Was there any?

It seemed agreed, and indeed obvious, that some co-ordination was necessary to prevent useless overlapping of work and to make full use of all new discoveries in the furtherance of research and to increase the scale of experiment and field trial.

For too long a time Britain had relied on the co-ordination given by fortuitous discussion within and around the Royal Society. The scale of research was now too large for that, and other means must be found. He used the word co-ordination rather than organisation deliberately, for the latter implied control and control meant loss of freedom which, they were all agreed, must not occur.

Another moot point was raised by Mr. Hopkirk when he said that teaching and research could not and should not be carried on together. But surely this was not true, especially in clinical subjects. For by combining the two, the teacher was not only kept well up to date in his subject but through the interest in research a useful link was formed with the "pure research" worker, and he (the teacher) could better appreciate the problems in research and the value of the results obtained. Teaching and research could easily and profitably be carried on simultaneously at field stations—a point which Mr. Ottaway did not mention when he was considering the sources of material for research. Nor did he bring to notice the value of abattoirs. Now that all animals to be slaughtered were purchased by the Ministry of Food, surely more use could be made of this valuable source of material not only for the pathology group, but also for research into physiology, a subject whose importance had been rather overlooked.

He would also like to mention the great saving of time and real value to beginners in research of training in technique. It could be efficient and thorough without being long and tedious and could easily be accomplished by short visits to various laboratories.

Mr. A. A. Wilson: He wanted to make the following points:—

1. Veterinary research workers should devote more time to fundamental work and should not be expected to spend their time solely on material and problems provided by clinical workers. Most of this type of work was of a purely *ad hoc* nature and disturbing to long-term experimental work; in a phrase, the research worker should be delivered from the tyranny of the clinician, and the cow-shed.

2. It was important that young graduates embarking on a research career should be properly trained before undertaking any piece of research so that they could acquire a scientific attitude to their work and also become accustomed to thinking in terms of their subject. In his own case, following a course in biochemistry, he felt more capable of approaching a problem in that having a grounding in biochemical thought and technique, he could now "think chemically."

Mr. G. H. Arthur: While he was in sympathy with the various criticisms which had been voiced, he would like to deal briefly with the more fundamental aspect of the subject.

The broad aim of scientific research was to increase man's understanding of the material world so that he would develop the capacity to control his environment and thus make life more secure. Hence it was a social function, and therefore it was right to expect adequate financial support from the public to further the practice of research. But public support necessitated public representation on administrative research bodies—if only to see that the money forthcoming was fairly spent. In our case, veterinary research workers were concerned directly with increased food production and a raised standard of living by applying science to animal husbandry. It was necessary for us, too, to tolerate lay representatives in veterinary research administration.

Having put veterinary research on a firm (public) financial basis, the next point concerned its development and disposition. Broadly speaking, veterinary research should be developed on a regional basis—the essential working unit being the area or regional (perhaps county) research centre. The allocation of funds to these regional stations and directives for, and co-ordination of research into, country-wide problems would be carried out by a central veterinary research council. Apart from these two items, central administration would be non-existent and each regional station would be an autonomous unit (with, of course, representatives of local authority, agricultural committee and health officer). The speaker emphasised that he was emphatically opposed to rigid central control which led to a stifling influence and operated against local initiative. In this way, apart from general national problems, already alluded to, each regional centre would pursue a policy of research into local problems. Every locality had its own special problems of animal husbandry, and if the unit was properly manned with pathologist, animal husbandman, physiologist, biochemist, clinician and botanist, all aspects of the problem would be investigated by the specialists working as a team. The more research developed, the more obvious became its co-operative rather than individual character. Here it was necessary to emphasise once again that veterinary research was not merely a laboratory job and that people other than bench workers—notably the clinician—were essential if research was to remain alive and related to problems in the field. Observations on

(Concluded at foot of next column)

CLINICAL COMMUNICATION

Fracture of the Os Calcis in a Young Jersey Bull

C. J. R. LAWRENCE and R. K. ARCHER

Eastbourne

Subject.—A Jersey bull, 11 months old.

History.—On May 21st we were called to attend to a bull which had damaged a hind leg in an accident. We were told that the animal had caught its leg in a wire fence and that it had struggled violently for some minutes before it could be released.

On examination the right hock was found to be very swollen and the animal was moving about on the other three legs.

The joint was hosed and on the next day it was encased in a firm bandage. On May 26th this bandage was removed and as a result of a further examination suspicion was aroused that the os calcis was fractured. An X-ray examination confirmed this view. The bull was destroyed as, although the lameness, which was at first extreme, improved, it was thought impossible that he should ever serve cows satisfactorily.

ABSTRACT

[Nutrition and Resistance to Infection. Part I: Some of the Variables Involved. Parry, Herbert. (1948.) *Proc. Roy. Soc. Med.* **41**. 324-326.]

The problem of nutrition in relation to resistance to infection involves four main variables, the host, the nutritional status of the host, the infection and the nature of the resistance. These variables often act in differing ways, so that it is only possible to unravel their conflicting actions by experimental methods under carefully standardised conditions.

1. The internal environment of the *host* is determined by manifold physiological factors, which are the basis of species and breed differences. They are determined by genetic constitution and developmental variation. The *genetic constitution* can be controlled by using highly inbred strains of a breed. *Developmental Variations* comprise differences due to age, external environment, stage and rate of growth, etc., and they must be standardised. Young animals are more resistant to certain neurotropic virus infections, the so-called "maturation resistance"; if animals do not grow normally, e.g., on a deficient diet, this "maturation resistance" may still be present in older animals.

2. The *Nutritional Status* of the host is only defined in part by the present consumption of individual nutrients, such as protein, vitamins, etc.; it is the *total nutritional situation*, namely, the previous, as well as present, intake and reserves of individual nutrients, their balance, the acuteness or chronicity of a deficiency, etc., which is important. Data of this kind can be obtained by feeding diets of highly purified constituents.

3. The *Infection* must be with a known strain of organism, with conditions such as portal of entry, dosage, auxiliary aids, etc., standardised as far as possible.

4. The term *Resistance* has been used to denote many effects. It may be considered at three levels, invasion resistance, systemic resistance and organ resistance.

(*a*) *Invasion Resistance* deals with the passage of parasites through the skin or mucous membranes. Vitamin A is considered to be an important factor in maintaining this resistance, but nicotinic acid deficiency in pigs allows Salmonella to multiply and enter the host's tissues. The entero-toxaemias of herbivores are also dependent upon special dietary conditions.

(*b*) *Systemic Resistance* was considered very briefly under anti-parasitic agencies and sensitivity to toxins. The *anti-parasitic agencies* include antibody formation, which can be modified by diet, phagocytosis, which is severely limited in the leucopenia of folic acid deficiency, and the absence of metabolites essential for the parasite. Diet may also affect the animal's *sensitivity to toxins*; thus a high ascorbic acid intake may reduce the sensitivity of man to diphtheria toxin.

(*c*) *Organ Resistance* embraces *organ entry resistance* and *organ damage resistance*. The classical example of the former is the blood-brain barrier. Factors involved in organ damage resistance are less well known, but vitamin B_1 is probably important in determining the damage to the C.N.S. caused by some neurotropic viruses.

(*d*) Many *Criteria of Resistance* have been employed. In comparative studies the same criterion must be used, and for work with certain neurotropic virus infections hindleg paralysis has been found a valuable quantitative criterion of resistance.

H. P.

ANNOTATION

Nutrition and Resistance to Infection

II.—Studies of Total Infections with special reference to Certain Neurotropic Viruses *

In another paper (Parry, 1948)* some of the factors which must be considered when attempting to assess the role of nutrition in resistance to infection were discussed. The importance of standardising quantitatively the four main aspects of the problem—namely the host, the nutritional status of the host, the characte. of the infection and the nature of the resistance—was stressed, and it was pointed out that it was now possible by using special diets of highly purified constituents to standardise the nutritional situation in experimental studies.

Before discussing some recent studies from the Wisconsin School on virus encephalomyelidites, data relating to some non-virus infections may be considered

1. Bacterial, Helminth and Protozoal Infections

(*a*) *Salmonellosis*

Webster (1930) was the first to provide clear evidence that nutrition played a not inconsiderable role in the aetiology of salmonellosis in small laboratory animals. Confirmation of this was extended by the workers at the London School of Hygiene, who found that on mixed diets mice not receiving dried skim milk were more liable to succumb to an infection with *Salmonella typhimurium* by the oral route (Watson, 1937) and that the disease spread more rapidly in a colony on the diet without skim milk (Watson *et al.*, 1938).

From 1936-37 onwards the investigation of the role of nicotinic acid (P-P factor) in the nutrition of the pig drew attention to the fact that some of the diarrhoeic signs attributed to nicotinic acid deficiency *per se* were in fact due to low grade intestinal salmonellosis, which the deficiency had permitted to develop (Birch *et al.*, 1937; Chick *et al.*, 1938a, b; Davis *et al.*, 1940). In fact, Davis and his co-workers suggest that some forms of the disease, necrotic enteritis of pigs, which is usually attributed to *Salmonella choleraesuis* infection, is essentially a nicotinic acid deficiency, the disease occurring on diets low in nicotinic acid and its incidence being controlled by administering nicotinic acid. They suggest that the deficiency permits *S. choleraesuis* together with other

[* Part I (see Abstract in this issue) comprises an introductory section, "Some of the Variables Involved" which has appeared in the *Proceedings* of the Royal Society of Medicine, **41**. 324-326. The substance of these papers was given at a meeting of the Section of Comparative Medicine (Royal Society of Medicine), on December 10th, 1947.]

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natural phenomena and their recording by the clinician were of equal import to the study of experimental processes by the laboratory worker. In the same way it was essential for the veterinary teacher to engage in research if his teaching was to remain alive.

The speaker welcomed the new veterinary investigation service, and thought it was a small step in the right direction. Further development of these units with workers other than bacteriologists was urgently necessary; plenty of men were available—in fact, there might soon be unemployment in the veterinary profession. Mr. Arthur also welcomed the proposed animal health regional service of the Animal Health Trust. At the same time he had some misgivings about the future of this body, for it seemed to derive its support in large measure from a section of the community which was doomed to disintegration. He would be happier to see a socialist Government develop its own comprehensive animal health service. We should probably find in future that veterinary research and veterinary state medicine would develop hand in hand along the lines he had indicated.

Mr. H. V. Hughes, after expressing his thanks to the openers of the discussion for their very interesting contributions, said he would confine his remarks to making one suggestion. It was that the Association should press for the establishment of facilities for the translation of extracts from foreign literature. His experience was that, whilst some of them might be able to read a little French or German, when they came across references in, say, Danish, Spanish or even Japanese journals, they encountered considerable difficulty in securing satisfactory translations. He considered that it was essential, if one was to keep abreast of modern research, that one should be able to obtain a translation even of a complete article without any feeling of "asking too much." He would suggest that the Council give this matter its serious consideration.

C. J. R. LAWRENCE and R. K. ARCHER : Fracture of Os Calcis

organisms such as *Fusiformis necrophorus* to become concentrated in the intestine and to establish themselves in the bowel wall.

(*b*) *Pneumococcal Infection in Mice*

By careful experimental technique, including paired feeding, Wooley & Sebrell (1942) have shown that mice on purified diets deficient in riboflavin or thiamine are more susceptible to an inhalation infection of *Pneumococcus*, which cannot be attributed to differences of food intake.

(*c*) *Typhus in Rodents*

There is evidence (Pinkerton & Bessy, 1939) that rats on a diet deficient in riboflavin are more susceptible to the rickettsial infection causing typhus.

(*d*) *Helminthiasis*

There is considerable clinical evidence which suggests that nutrition plays an important role in determining the resistance to certain forms of alimentary helminthiasis, although under field conditions any nutritional inadequacy is soon accentuated by disturbances of alimentation due to the parasites. *Haemonchosis* of sheep under Australian conditions is often a disease of poor nutrition and animals throw off clinical evidence of the infestation much more rapidly when fed an adequate diet. A similar view of other alimentary infestations is widely held by clinicians and it seems probable that it is the total nutritional status that is important rather than a deficiency of any particular nutrient, although several workers have sought to incriminate vitamin A as the principal factor. Thus vitamin A deficiency has been said to increase the severity of infestations of *Ascaridia lineata* in chickens (Ackert *et al.*, 1931), *Nippostrongylus muris* in mice (Spindler, 1933), *Syngamus trachea* in chickens (Clapham, 1934a), *Toxascaris canis* and *Toxocara canina* in dogs (Wright, 1935), and *Strongyloides ratti* in rats (Lawler, 1941). Apart from Lawler's studies the data are not very convincing and Clapham (1934b) was unable to show any increased susceptibility to *Ascaris lumbricoides* in vitamin A deficient pigs. Lawler, however, does present evidence that in the vitamin A deficient rat the resistance offered by the tissues, notably the reticulo-endothelial system, to the penetration of the larval stages of *Strongyloides* may be less than in the adequately nourished animal.

(*e*) *Cutaneous Acariasis*

There seems little doubt from much clinical experience that the under-nourished animal is more prone to severe infestations of the skin acari, particularly lice, and that the course of an infestation otherwise untreated may be affected markedly for better or for worse by altering the nutritional status of the host.

(*f*) *Trypanosomiasis*

It is well recognised by clinicians that nutritional status is often of great importance in *T. congolense* infections in cattle in Africa. The acute fatal forms of the disease occur so often at the beginning of the wet season, when the nutritional status of the animal is at its lowest and even frank starvation occurs. Little accurate experimental data, which would indicate which nutrients are principally involved, is available.

The general trend of the data is that animals in a sub-optimal state of nutrition are less resistant to certain bacterial, helminth, rickettsial and protozoal infections. Although there are grounds for the view that a deficiency of specific nutrients such as nicotinic acid, riboflavin, thiamine and vitamin A may be the cardinal factor in certain special cases, it seems more likely that the total nutritional situation is the more important consideration. The whole subject seems ripe for critical re-investigation with the more adequate control of the nutritional factors, which is now possible.

2. Virus Encephalomyelidites

Recent studies have thrown new light on the importance of the role nutritional status plays in determining whether functional damage occurs in the central nervous system following infection with neurotropic viruses.

The early work suggested that deficiencies of thiamine and ascorbic acid decreased resistance. Kuczynski (1937) reported that mice on natural diets deficient in thiamine were more susceptible to the encephalitis caused by yellow fever virus. Jungeblut (1937a, b) investigated the therapeutic action of ascorbic acid parentally in monkeys inoculated with poliomyelitis virus intracerebrally. He thought he was able to show a slight alleviating effect with moderate doses of ascorbic acid, but Sabin (1939) considered that the effect was too slight to be demonstrated with certainty. The epidemic of poliomyelitis in St. Helena in 1945 (Nissen, 1947), provided no evidence that ascorbic acid played an important role in determining the severity of the neurological defects. On the contrary, animals deficient in certain nutrients may be less likely to suffer residual damage to the nervous system and the carefully controlled studies of the Wisconsin school have illuminated this aspect of the problem.

The real problem in all studies of this kind is to *standardise the experimental conditions* so that the effects of the many variables are not mutually exclusive, *i.e.*, to standardise precisely the nutritional situation, the experimental animal and the infection. By 1942 it was possible to maintain small laboratory animals on carefully standardised diets of highly purified constituents supplemented by synthetic accessory dietary factors, *i.e.*, complete control of the nutritional situation was achieved. The time was ripe for a "combined operation" by nutritionists and bacteriologists. Elvehjem and his colleagues provided the nutritional experience, while Clark and his co-workers supplied the knowledge of the infection. The result has been a series of careful experiments of great interest in which large numbers of animals have been employed. They have used the East Lansing strain of poliomyelitis virus in mice and monkeys, Theiler's mouse encephalitis virus in mice and avian encephalomyelitis virus in chickens, employing the rate of development of paralysis of the hind-limbs as their criterion of resistance. They have established the importance of dietary thiamine, folic acid, potassium and phosphorus in determining the occurrence of residual neurological defects, and have ruled out, by paired feeding experiments, the possibility of "maturation resistance" phenomena being responsible for this.

In their earlier studies on *thiamine*, Rasmussen *et al.* (1944a) demonstrated in young Swiss mice that, with Theiler's virus intraperitoneally or the East Lansing strain of poliomyelitis intracerebrally, there was a lower incidence of paralysis in the thiamine-deficient groups, which was in part due to a maturation resistance effect but in part due to the thiamine deficiency. The unaffected survivors on the thiamine-deficient diet did, however, become paralysed when given a diet containing adequate thiamine, *i.e.*, an adequate intake of thiamine permitted the infection to progress and cause extensive damage to the nervous system. These results have been confirmed by Foster *et al.* (1943; 1944a, b), who found that thiamine-deficient mice inoculated with the East Lansing strain of poliomyelitis virus were more resistant as judged by a longer incubation period and less paralysis.

With individual deficiencies of *pyridoxine, inositol* and *biotin*, no consistent results with statistical validity were obtained following intracerebral inoculation of poliomyelitis (East Lansing strain) and Theiler's virus in 1,400 Swiss mice (Lichstein *et al.*, 1945). This effect was not due to a "maturation resistance" associated with a smaller food intake.

With *pantothenic acid* and *riboflavin* deficiencies in Swiss mice the results varied with the virus used. Thus, pantothenic acid deficient animals showed an increased resistance to intracerebral inoculation with Theiler's virus, but none to the East Lansing strain of poliomyelitis (Lichstein *et al.*, 1944), while *riboflavin* deficient animals behaved essentially in an opposite manner, being slightly more resistant to the poliomyelitis virus and equally susceptible to Theiler's virus (Rasmussen *et al.*, 1944b).

Mineral intake can also be important. Under similar experimental conditions the susceptibility to Theiler's virus of Swiss mice on diets deficient in potassium and phosphorus was decreased, on diets deficient in sodium slightly decreased, while those on diets low in calcium, magnesium or chlorine were unaffected (Lichstein *et al.*, 1946a).

The Wisconsin workers have also used *avian encephalomyelitis virus* inoculated intracerebrally in chickens, using leg paralysis as the criterion of infection: the results emphasise the importance of the phenomenon of "maturation resistance," and the effects of small variations in the total nutritional situation. Thus, if one-day-old chicks be placed on low, suboptimal and optimal thiamine diets, the optimal thiamine group are most resistant. If, however, the chicks are given an optimal thiamine ration for two weeks after hatching before being placed on experiment, those receiving the least thiamine are now most resistant (Cooperman *et al.*, 1946).

Lastly, there are the results in which the M.V. strain of *poliomyelitis virus* was studied in adult *Macaccus mulatta*, in which the role of maturation resistance does not arise. Results with thiamine deficient animals were inconclusive (Clark *et al.*, 1945), but the importance of folic acid was demonstrated clearly in a series of 40 odd animals and the role of yet another facet of the nutritional situation, the acuteness or chronicity of the deficiency, was demonstrated (Lichstein *et al.*, 1946b). Monkeys suffering from a chronic deficiency of folic acid were definitely resistant to the intranasal inhalation of virus, and there were no signs of paralysis, although there were microscopic lesions in the C.N.S., *i.e.*, organ resistance was probably enhanced. In acutely deficient monkeys, on the other hand, they could demonstrate little difference between control and deficient animals to infection by the intranasal or the intracerebral route, *i.e.*, acute folic acid deficiency does not apparently affect the blood-brain barrier. One animal inoculated when chronically deficient showed no clinical signs and was later placed on an optimal diet, when in due course it was inoculated intracerebrally; it was found to be fully susceptible, *i.e.*, the first exposure had established no permanent resistance to the virus.

Thus, in general and in contra-distinction to the results with

other infections noted above, the chronically ill-nourished would appear to be the more resistant to these neurotropic viruses: however, no general rule can be formulated, for the situation varies with the duration and precise nature of the nutritional deficiencies and the virus employed, as well as the species and the general physiological state of the subject.

GENERAL CONCLUSIONS

1. With bacterial, helminth and protozoal infections, resistance to the infection appears to decrease as the nutritional status of the host declines.

2. Although some have sought to incriminate vitamin A as the prime factor, it seems probable that the total nutritional situation is the important consideration.

3. With certain neurotropic viruses, animals deficient in regard to certain members of the vitamin B-complex and certain minerals are more resistant.

4. The precise response varies so much with different viruses and different deficiencies in the various animal species, that no general rule can be formulated.

5. The acuteness or chronicity of a deficiency can completely change the response of a host to a virus infection.

6. The cardinal nutritional factor in resistance to infection is the total nutritional situation, *i.e.*, the present consumption of nutrients, their balance and previous consumption.

7. To study adequately the role of nutrition in resistance to infection, accurate quantitative studies obtained by individual daily food consumption records on diets of highly purified constituents are essential.

HERBERT PARRY.

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WEEKLY WISDOM

"What I have said about it [good official writing] is governed throughout by three fundamental precepts. Be simple. Be short. Be human. . . . We shall moreover have to consider the implications of the remark [already made]: 'Lapses from the conventionally correct irritate the educated reader, and distract his attention; and so make him less likely to be affected precisely as you wish.' We shall [therefore] have to add another precept: Be correct. . . ."— PLAIN WORDS. A GUIDE TO THE USE OF ENGLISH. By Sir Ernest Gowers. 1948. London: H.M. Stationery Office. [Price 2s. net.]

NOTES AND NEWS

Diary of Events

Sept. 29th, 30th, Oct. 1st.—R.C.V.S. Committee and Council meetings, 10, Red Lion Square, W.C.1.

Oct. 1st.—Meeting of the Welsh Branch, N.V.M.A., at Newtown (Bear Hotel), 2.30 p.m.

Oct. 6th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m.

Oct. 7th.—Meeting of the Central Veterinary Society at the Royal Veterinary College, 2 p.m.

Oct. 8th.—Institute for the Study of Animal Behaviour—Scientific Meeting in the lecture room of the Linnean Society, Burlington House, W., 3 p.m.

Oct. 21st.—Meeting of the Western Counties Division, N.V.M.A., at Exeter (Rougemont Hotel), 2 p.m.

Oct. 21st.—Meeting of the South Eastern Division, N.V.M.A., at the Royal Veterinary College, Camden Town, N.W.1, 2.30 p.m.

Oct. 28th and 29th.—N.V.M.A. Grassland Conference at the Wellcome Foundation, 183, Euston Road, London, N.W.1.

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N.V.M.A. Committees and Council

There will be Committee Meetings at 36, Gordon Square, W.C.1, on October 7th and 8th, as follows:—

October 7th.—2 p.m., Veterinary State Medicine Committee.
4 p.m., Parliamentary and Public Relations Committee.

October 8th.—10 a.m., Technical Development Committee's Subcommittee on Mastitis.
10 a.m., Organising Committee.
11.30 a.m., Home Appointments Committee.
2 p.m., General Purposes and Finance Committee.

The next quarterly meeting of the Council of the Association will be held at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2, on Wednesday, October 27th, at 11 a.m.

The above-mentioned date has been chosen to fit in with the N.V.M.A. Conference on "Grassland and Animal Health," and members of Council who propose to attend the Conference will need to book hotel accommodation for October 27th, 28th and 29th.

The programme of the Conference is published on page 472 of this issue.

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THE N.V.M.A. CONGRESS

(Concluded)

In our last issue we carried to the Monday evening our preliminary account of the proceedings of the scientifically interesting and socially unsurpassed Congress which ended at Southport on Wednesday, September 15th. The introduction of a paper on poultry diseases reflected the increasing importance of this aspect of veterinary work, and it was regrettable that an early start on Tuesday morning, after the "small hours" finish of the annual dinner, resulted in a meagre attendance for the discussion of Mr. J. E. Wilson's careful summary-review of our present knowledge of bacillary white diarrhoea, fowl typhoid and infection with Salmonella other than *S. pullorum* and *S. gallinarum*. Moreover, the attempt to get two important papers discussed before lunch brought the customary retribution in curtailment, particularly evident in connection with the second item, "Observations on Canine Encephalitis," by Mr. A. B. MacIntyre and Drs. D. J. Trevan and R. F. Montgomerie, inasmuch as it attracted possibly the largest attendance ever present at the concluding

scientific session of an N.V.M.A. Congress. This result of close collaboration between the authors and many practitioners was presented as an interim report (with histological slides and exhibits) mainly concerned with "hard pad" disease, relatively recently recognised as an epizootic in Britain. There is, however, no blame to be laid for lack of discussional time; the Provisional Committee did a magnificent job and it *is* impossible to meet all the claims made upon the hours in one short week, more particularly when the attractions of such a conference centre, quite properly, demand some attention during daylight. The only evening remaining for review was that of Tuesday, September 14th, when the Ladies' Veterinary Benevolent Guild Dance achieved a new "high," particularly in the important matter of raising money for the Fund: the astute auctioneering methods of Mr. Steele-Bodger in accepting nods and winks that were not there intrigued both promoters and victims alike. Another popular feature of the occasion was his presentation of the golf trophy to Mr. George Gould.

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The closing meeting (adjourned annual meeting) was quite remarkable for the manner in which the formality of the array of tributes and votes of thanks on the agenda was submerged in sincerity of feeling. This found its most fervent expression in the acknowledgments accorded the Hon. Local Secretary and Mrs. Hewetson (to whom presentations were made), to the Provisional Committee, with deservedly special mention of its dynamic Chairman, Professor Wright, to the Mayor of Southport and Mrs. Raynor, whose personal interest in our proceedings and welfare will remain an abiding memory—and, of course, to Mr. L. Guy Anderson, the perfect President, and Mrs. Anderson, his sustaining and self-sacrificing helpmeet.

An outstanding feature of this year's Congress was the presence of a record number of representatives from veterinary associations overseas, including those of many of the countries of Europe. Their enthusiastic interest was both delightful and infectious and contributed immensely to the success achieved. At this meeting all those present returned thanks for the warmth of the welcome accorded them and acclaimed the excellence of the conference and the value of the work of the Association. In the words of one of them: "In spite of differences of colour, creeds and views of every kind, this Congress has proved that the veterinary profession is one brotherhood throughout the world." The President, responding, asked our overseas friends to take back with them to their various countries the Association's warmest good wishes and appreciation of their substantial contribution to the enjoyment of a memorable week.

Mr. Anderson then spoke of the 1948 meeting as the triumphant termination of his year of office as President. He thanked the Officers and Committee Members for their loyalty and friendship—also that "automatically received from every single member"—and added his keen appreciation of the work of the permanent staff, with special reference to that of Mr. Knight, the General Secretary.

Mr. Anderson then laid down the reins of office, inducting Dr. R. F. Montgomerie, his successor, to the Presidential Chair with the words: "There are one or two problems looming in the background and I think we are extremely fortunate in having a man of the calibre of Dr. Montgomerie to lead us during the coming year." The new President accepted the honour "with a high measure of determination"; it was his wish that his year of office should be marked by still further increase in progress. A special word of welcome for the President-Elect, Mr. Jack Bruford, of Sevenoaks, and of hope for the early and complete restoration to health of Mr. T. L. Wright, who held high office in the Association for a number of years, preceded the declaration of the close of "a supremely happy and enjoyable Congress."

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Congress Paper—Some Observations on Canine Encephalitis

Several members have complained that the time available for discussion on the paper presented by McIntyre, Trevan and Montgomerie was quite inadequate and that they were thus precluded from making a contribution. In these circumstances, it has been decided that written communications will be accepted as part of the discussion. Members are invited to contribute by having the material they wish to present in the hands of the Editor by October 7th. These communications, together with the record of the meeting, will be placed at the disposal of the authors so that their reply may cover all the points raised.

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Applications for Additional Supplies of Petrol

Mr. John Holroyd, Liaison Officer for the North Western Region, writes to point out that he has recently received complaints from the Regional Petroleum Officer concerning the large number of veterinary surgeons who apply for additional supplies of petrol during the last two or three weeks of a rationing period, such late applications affording him insufficient time to consider them and despatch coupons in time for use before the end of the period, after which, any coupons issued are invalid.

We believe this complaint to be applicable to other areas also and therefore would urge all members to ensure that their applications for additional supplies reach the Regional Petroleum Officer or the Liaison Officer, as the case may be, not later than the first day of the last month in any rationing period.

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PERSONAL

Appointments.—The *Highland News* states that Inverness County Council has made the following appointments to the posts of Veterinary Officers in North and South Skye: *North District*—Mr. Edwin Dixon, B.SC., M.R.C.V.S., Lerwick, who for the last four years held a similar appointment with the Nigerian Government. *South District*—Mr. Donald J. Campbell, M.R.C.V.S., Glasgow, lecturer for two years on parasitology at Glasgow Veterinary College.

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Births.—BELL.—On September 4th, 1948, to Margaret, wife of Fred R. Bell, B.SC., M.R.C.V.S., of the Royal Veterinary College—a son.

WILLIAMS.—On September 7th, 1948, at Carmarthen Maternity Hospital, to Mary (*née* Harries), wife of Eric I. Williams, M.R.C.V.S., St. Clears, a son—Thomas Harries.

WYKES.—On September 9th, 1948, to Nancy (*née* Donald, M.R.C.V.S.), wife of David Wykes, Dunholme Lodge Farm, Lincoln—a son.

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Marriage.—WARREN—UHRIG.—On Saturday, September 4th, 1948, in Bassersdorf, Alan George Warren, B.SC., M.R.C.V.S., son of Mr. and Mrs. G. J. Warren of 26, the Drive, Beckenham, Kent, to Elsa Uhrig, younger daughter of M. et Mme. F. F. Uhrig of Bassersdorf, Zürich, Switzerland.

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Miss Marion Stewart, formerly of 85, Earls Court Road, London, W.8, writes to inform us that she has now settled in Southern Rhodesia and "has a small place just outside Salisbury." There are no postal deliveries, but she has managed to acquire a private bag, and communications should be addressed, P/Bag 167H, Salisbury, S. Rhodesia.

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R.C.V.S. OBITUARY

PARKINSON, Senator James J., Maddenstown Lodge, Curragh, Kildare, Eire. Graduated London, December 13th, 1892. Died September 16th, 1948; aged 78 years.

Senator J. J. Parkinson, M.R.C.V.S.

We record above with deep regret the death of Mr. James Joseph Parkinson, a great personality of the Irish Turf, who was one of the most successful breeders, trainers and owners in the country. His energies were not confined to the Turf, however, but found expression in other pursuits and more particularly in political life. In 1922 Mr. Parkinson was elected to the Senate of the then Irish Free State on the Cultural and Educational Panel. He was a member of this Senate until its abolition in 1936. When Seanad Eireann was reconstituted under the new Constitution, Mr. Parkinson again returned to the Senate, of which he remained a member until August, 1947, when he resigned owing to failing health.

Senator Parkinson was an accomplished amateur rider, and was the first amateur to adopt the American style of riding with short stirrup leathers, and to require his jockeys to ride in similar style. He built Maddenstown Lodge and its extensive stabling, and on ceasing to ride took up training.

A native of Tramore, Co. Waterford, after graduation James Parkinson spent some time as a pupil of the late Michael Dennehy at the Curragh, acquiring knowledge of training and racing. Venturing forth on his own account as an owner-trainer, success soon came his way, and his stable acquired an international reputation. His first winner was Noiseless at the now defunct Birr meeting in 1893. Subsequently, he appointed the late Tom Miller as his private trainer at Brownstown Lodge, Curragh.

Five times since 1908, when statistical tables of trainers' winnings were first compiled in Ireland, he headed the trainers' section, and twice topped the owners' tables. With First Flier, which he bought for 35 gns. as a yearling at Newmarket, he won the 1917 Irish Derby, and two years later he had his second success in the Irish classic with Loch Lomond. Orby, when two years old, Americus Girl, Trepida, The Gunner (third in the 1904 Liverpool Grand National), and Prince Pedro were other important winners which he trained.

His biggest feat was accomplished in 1909, when he took to the Epsom Derby meeting five runners—Americus Girl, Wedding Ring, William Penn, Well Done, and Decidedly, the first four winning and the last named being beaten only a head. All five were ridden by the late John Thompson, who served his apprenticeship with Parkinson and remained with him as first jockey until his tragic death as a result of a fall when schooling a hurdler. In 1923 Mr. Parkinson won 134 races with 60 horses, to the value of £12,150. All three totals are Irish training records.

His son, the late Mr. W. J. Parkinson, held the Irish amateur riders' record with 72 wins in 1915.

The *Irish Times* says of Senator Parkinson: "He was hopeful of bloodstock breeding as a national export industry. Many of his horses were purchased by him at bargain prices, and in these matters he relied on his innate judgment as much as his experience."

Mr. Parkinson was chairman of the Tramore and Limerick Junction racecourse companies. He was a director of Goff and Company and of the Navan Racecourse Company, and also held a directorship of Flemings Fireclay Company. He interested himself in pioneering the Tote, and was a director of Tote Investors, Ltd.

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COLONIAL AGRICULTURAL RESEARCH

Dr. G. A. C. Herklots, recently secretary for development in Hongkong, has been appointed secretary for colonial agricultural research and secretary to the committee for colonial agricultural, animal health and forestry research, in succession to Dr. H. H. Storey, who has been appointed deputy director of the East Africa agriculture and forestry research organisation.

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TRANSPORT OF NEW-BORN CALVES TO MARKET

Bath Committee's Call for Prohibition

"In spite of a letter from the secretary of the Association of British Markets Authorities asking them to reconsider their call for a regulation to prohibit the taking of newly born calves to market, Bath Markets Committee," states the *Bath Chronicle and Herald*, "are to 'keep pegging away' in their efforts to stop the cruelty which, they say, is caused to the young animals on their journey with heavier beasts to the abattoir near Bristol.

"The committee had informed the Association they wished a resolution on the subject to go on the agenda of the next annual conference. In his reply, the secretary stated that a Ministry of Agriculture official agreed with him as to the difficulty of assessing the age in days of a new-born calf and, therefore, the regulation suggested by the Bath committee, was impracticable.

"The letter added that owing to the scarcity of milk, the Ministry were in favour of the early marketing of calves unsuitable for rearing.

"Alderman Major Adrian Hopkins said the publicity the committee's views had received had caused considerable comment in the city and there was wide support for them. He suggested they replied to the Association, 'Are we to assume from your letter that the Ministry is in favour of cruelty to animals?'

"Councillor E. M. Trounson said if a regulation was made, it would stop some people from taking very young calves to market.

"The chairman (Councillor R. J. Marshall) said this week there were one or two calves at Bath Market not more than two days old. Owing to his intervention, one was put in a separate crate on the lorry taking animals to the abattoir. He thought R.S.P.C.A. inspectors could do something by inspecting the animals after their journey to the slaughterhouse. Any regulation must be applied nationally.

"Alderman Hopkins said it was an extraordinary situation. They tried to do good and were blocked at every turn.

"He moved a resolution, which was carried, that the committee considered the situation was extremely unsatisfactory, and urged that it should be dealt with. The committee would bring the matter up again at the next Association meeting and annual conference."

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NIGERIAN LIVESTOCK MISSION

The Secretary of State has appointed a mission to visit West Africa to investigate the livestock industry in Nigeria and the Cameroons under British Mandate, with particular reference to meat production. The mission will also engage in discussion where necessary with the authorities of the neighbouring French territories on problems of mutual interest.

The leader of the mission will be Sir Frank Ware, C.I.E., F.R.C.V.S., formerly Animal Husbandry Commissioner to the Government of India, and the members will be Mr. Thomas Shaw, a Director of Messrs. Zwanenberg-Organon, Ltd., and Mr. Gilbert Colville, who has special experience in the breeding-up of African cattle. Arrangements are being made for local officers of the Veterinary, Agricultural and Geological Departments to be attached to the mission.

The mission will leave for Nigeria early in October for six or seven weeks and will probably pay a further visit to the country in February or March to see the country and the cattle at the end of the dry season. During their first visit they will spend a few days in the Gold Coast at the invitation of the Gold Coast Government to discuss with them problems in connection with the cattle industry there.

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THE EOSINOPHIL "GRANULE" AND ITS POSSIBLE RELATION TO THE RED BLOOD CELL

What is really the origin of the "mere haemoglobin-freighted drops of protein," as the late D'Arcy W. Thompson called the red blood cells in his classic work, "On Growth and Form"? There have been many theories to explain their origin adduced by haematologists. One of the latest is that of Frederick Duran-Jorda, of the Pathology Department, Ancoats Hospital, Manchester (*Lancet*, September 18th, 1948, p. 451). His theory is that they are none other than the extruded "granules" of the eosinophils. Veterinary workers are, of course, highly familiar with the great variation in size and shape shown by the eosinophil granules in the different species of domesticated animals. Duran-Jorda had already claimed to show that in the herbivora the red cells, having apparently undergone enlargement as "granules" within the mother cells in the spleen, were extruded from the eosinophils in the gastric and intestinal mucosa. Among the herbivora this process could be most plainly observed in the horse, in which species the eosinophil granules are already very large as seen in the peripheral blood and closely resemble small red blood cells as they occur within the cytoplasm of the eosinophil; and, in the spleen their enlargement is particularly evident. It had been objected to the theory, however, that the converse was probably the true explanation, namely that the large red "granules" with the leucocytes were really red blood cells in process of phagocytosis. To confute this criticism, a study was then made of the red cells of the camel, which as they occur in the circulating blood are well known to be elliptical. All granules in the eosinophils of this animal were also then shown to be elliptical. "They are smaller than those of the horse but larger than those of man, and it was most satisfactory to find this elliptocytosis in the granules both when they were contained in the cell and after they had broken out of the cytoplasm in the act of smearing. The granules in the eosinophils of the peripheral blood showed a definite range of

sizes, but even at their largest they were never so big as those found in the horse." "If the granules can grow larger in the cells," Duran-Jorda maintains, "one can imagine their expulsion into the circulating blood as perfectly developed red cells." It should not be difficult, when studies have been made upon the gastric and intestinal mucosa and the spleen of this species, to obtain the necessary visual confirmation of the transformatory process.

J. T. E.

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LICENSING OF BULLS AND BOARS: ENGLAND AND WALES

The tables recently issued by the Ministry of Agriculture and reproduced below show the numbers of bulls and boars licensed in England and Wales during the year ended March 31st, 1948, and comparable figures for the previous year. The increase in the numbers of bulls licensed is most marked in the dairy breeds and it is encouraging that the proportion of bulls of the dairy breeds qualifying for Dairy (Official Milk Record) licences is steadily advancing. The number of beef bulls licensed remains practically unchanged from the previous year.

Of the total bull licences issued, 3,397 were Beef, 9,421 Dairy (Official Milk Record), and 19,487 General Class licences, whilst 2,544 Dairy licences were substituted for General Class licences, which reflects the value that breeders place upon a licence of this character.

During the year, 44 bull owners were found guilty of offences under the Act and Regulations.

The heavy increase in the number of boars licensed and the considerable drop in the proportion rejected indicate not only progress towards a healthy recovery in the pig population but the observance by breeders of a higher standard in selecting breeding stock.

During the year, three boar owners were found guilty of contravention of the Act and Regulations.

PARTICULARS OF APPLICATIONS FOR LICENCES TO BE DEALT WITH IN ENGLAND AND WALES DURING THE YEARS ENDED MARCH 31ST, 1947, AND 1948

Licensing of Bulls

	Year ended 31.3.47	Year ended 31.3.48
Bulls licensed	30,297	32,305
Bulls rejected	3,758	3,843

Licensing of Boars

	Year ended 31.3.47	Year ended 31.3.48
Boars licensed	4,050	7,989
Boars rejected	550	718

LICENSING OF BULLS

Particulars by Breeds, of Bulls Licensed in England and Wales during the years ended March 31st, 1947, and 1948

	Year ended 31.3.47	Year ended 31.3.48
Aberdeen Angus	478	422
Ayrshire	2,365	2,837
Blue Albion	11	7
British Friesian	7,110	8,285
Devon	656	518
Dexter	23	20
Dun and Belted Galloway ...	6	4
Galloway	76	99
Gloucestershire	4	4
Guernsey	1,379	1,549
Hereford	1,524	1,742
Highland	6	6
Jersey	661	836
Kerry	13	14
Lincoln Red Shorthorn	1,045	994
Longhorn	—	3
Park (British White)	7	12
Red Poll	542	587
Shetland	—	5
Shorthorn	13,291	13,430
South Devon	531	426
Sussex	157	173
Welsh Black	412	332
Total	30,297	32,305

LICENSING OF BOARS

Particulars by Breeds, of Boars Licensed in England and Wales during the years ended March 31st, 1947, and 1948

	Year ended 31.3.47	Year ended 31.3.48
Berkshire	77	152
Cumberland	2	10
Dorset Golden Tip	—	1
Essex	374	914
Gloucester Old Spots	15	24
Large Black	256	603
Large White	2,652	4,851
Large White Ulster	—	3
Lincolnshire Curly Coat	18	—
Long White Lop-eared	19	69
Middle White	63	102
Old Oxford	—	1
Oxford Sandy and Black	1	2
Tamworth	71	122
Welsh	18	13
Wessex Saddleback	479	1,097
Yorkshire Blue and White ...	3	25
Total	4,050	7,989

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UNQUALIFIED ANIMAL PRACTITIONERS

Unqualified animal practitioners have been the subject of correspondence in *The Field*, and we quote below a letter—published in the issue for September 18th:—

"Sir,—Owing to pressure of work I have only just seen your issue for July 31st containing a letter under the above heading.

"It is amusing to note the way in which your correspondent assumes that all veterinary surgeons are inexperienced young men straight from college, while all the unqualified practitioners are middle-aged or elderly, and backed by long years of experience. We also seem to remember something of the sort being said recently in the House of Commons, where some members implied that only lack of money or service in His Majesty's Forces had precluded the unregistered practitioner from having obtained the qualification of M.R.C.V.S. Nothing was said about the war service of members of the veterinary profession, or of veterinary students, whose studies had had to be deferred for a matter of years.

"With regard to the statement that 'a pound of practice is worth more than a ton of theory,' one must bear in mind that no one can diagnose a disease of which he has never heard!

L. Guy Anderson,
(*President*, National Veterinary Medical Association)."

CORRESPONDENCE

Correspondents are requested to write as briefly as possible

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

THE SLAUGHTERING OF ANIMALS

Sir,—I ask to be allowed to cite two recent instances of what appears to be the indifference of our profession as a whole to humanitarian questions affecting domesticated animals.

The first instance is the failure to follow up or implement in any official or effective way the plea by Mr. Bywater for long overdue reform in the matter of oriental methods of slaughter in our abattoirs.

The second instance is the total absence of any objection on humanitarian grounds to the suggestion of Mr. Roderick Macgregor, in your issue of June 19th, that the "pithing" of cattle may be tolerable from a humane point of view.

It is common knowledge among those of us who are familiar with the process of "pithing" that the precision of the stroke necessarily varies with the skill and experience of the butcher, with the steadiness of his hand, the quality of his vision and with the movements of the animal. Moreover, every would-be "pither" must learn to "pith" and the only way to learn is by practising on the live animal, *i.e.*, by trial and error.

No experienced observer of this abominable method, if he had to choose between death by shooting or "pithing," would choose the latter: indeed he would recoil with horror from the bare suggestion that death by "pithing" might be his fate.

The great difference between the lower mammals and man in their relative liability to unconsciousness as a result of surgical shock makes it likely that the "pithed" ox suffers for an appreciable period intense agony, even when the spinal cord has been accurately pierced.

When the blow has not been accurate, there could hardly be a more revolting spectacle of torture.

Yours faithfully,

Department of Agriculture,
Animal Health Services,
Deloraine, Tasmania.

J. W. Rainey.

August 22nd, 1948.

NATIONAL VETERINARY MEDICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND

CONFERENCE

ON

Grassland and Animal Health

OCTOBER 28TH AND 29TH, 1948,

AT THE HEADQUARTERS OF THE WELLCOME FOUNDATION,

183-193, EUSTON ROAD, LONDON, N.W.1

FIRST DAY, OCTOBER 28TH :

11 a.m.	... ...	Official opening of the Conference.
11.15 a.m.	... ...	Opening paper : " Grassland Development and the Expansion Programme for England and Wales." Mr. W. D. Hay, Grassland Development, Ministry of Agriculture.
12.30 p.m.	... ...	Luncheon.
2 p.m.	... ...	" Grassland Management for Animal Production." Sir George Stapledon, C.B.E., M.A.
2.45 p.m.	... ...	" Chemistry of Grassland." **
3.15 p.m.	... ...	Fifteen minutes' break for tea.
3.30 p.m.	... ...	" Recent Developments in Seeds Mixtures." Dr. William Davies, Director, Grassland Improvement Station, Stratford-on-Avon.
4.15 p.m.	... ...	" Habits of the Grazing Animal." Professor Martin Jones, M.SC., Department of Agricultural Botany, King's College, Newcastle-upon-Tyne.
4.45 p.m.	... ...	General discussion. Opening speakers : **

SECOND DAY, OCTOBER 29TH :

9.30 a.m.	... ...	Opening paper : " Grassland in Relation to Animal Health." Mr. G. N. Gould, M.R.C.V.S.
10.15 a.m.	... ...	" Parasites and Grassland." Dr. E. L. Taylor, M.R.C.V.S., D.V.H.
10.45 a.m.	... ...	Fifteen minutes' break for coffee.
11 a.m.	... ...	" Major and Minor Mineral Elements in Relation to Animal Health and Pasture Management in the British Isles." **
11.30 a.m.	... ...	" The Oestrogenic Factor in Subterranean Clover in Australia." Mr. D. H. Curnow, M.SC., Courtauld Institute of Biochemistry, Middlesex Hospital Medical School, London.
11.50 a.m.	... ...	" Physiological Dysfunctions and Metabolic Disorders in Grazing Animals." (1) " Significance of Vitamins ; Acetonaemia ; Photosensitisation." **
12.30 p.m.	... ...	Luncheon.
2 p.m.	... ...	(2) " A Factor in Pastures Affecting Muscle Activity." Mr. W. S. Ferguson, F.R.I.C., Jealott's Hill Research Station, Imperial Chemical Industries, Ltd.
2.30 p.m.	... ...	(3) " Hypocalcaemia, Hypomagnesaemia, Hypophosphataemia and Fog Fever." Captain J. R. Barker, M.R.C.V.S., D.V.H.
3 p.m.	... ...	General discussion. Opening speakers : ** **
4.45 p.m.	... ...	Summing-up by Professor T. Dalling, M.A., M.R.C.V.S.

** The proposed speakers' final acceptance has not yet been received.